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Preventing successful assassination attacks by terrorists: an environmental criminology approach

Abstract:

Purpose*:* *This paper uses an environmental criminology and situational crime prevention (SCP) framework to study global assassinations carried out by terrorists. We set forth a series of hypotheses to explain successful and unsuccessful assassination incidents.*

Design*:* *We use assassination data from the Global Terrorism Database (GTD) from 1970 to 2014 to estimate a series binary logistic regression models.*

Findings*:* *Results indicate that various situational factors contribute to successful assassinations, such as target types, weapon types, total fatalities and injuries.*

Practical implications*:* *These findings suggest that environmental criminology and SCP are valuable in developing prevention measures that thwart and disrupt attempted assassinations by terrorists.*

Originality/value: *Criminology has yet to apply environmental criminology and SCP to assassinations, a tactic often used by terrorists. This paper thus extends the existing assassination, terrorism, and criminology literature by applying this framework to assassinations performed by terrorists.*

Keywords*:* *Terrorism, assassination, environmental criminology, situational crime prevention, Global Terrorism Database, political violence*

Paper type*:* *Research paper*

Introduction

This paper applies environmental criminology and situational crime prevention (SCP) to assassinations performed by terrorists. We investigate a series of hypotheses to account for whether an assassination was successful (i.e., the target was killed) or not. In June 1914, Archduke Franz Ferdinand, the heir to the Austro-Hungarian throne planned a visit to Sarajevo, the Bosnian capital. Despite having received several warnings of the danger that existed in Sarajevo and having been urged by the Emperor and his chamberlain to cancel the trip, the Archduke refused to postpone the visit (Lebow, 2000). On the morning of June 28, the Archduke arrived in Sarajevo and was driving to the Town Hall when a Serbian nationalist threw a grenade at his car. The bomb missed the Archduke's car and exploded nearby injuring two officers in the following car along with some bystanders. After the explosion, the Archduke insisted on continuing his visit (Lebow, 2000). During his return from the Town Hall, Gavrilo Princip, a member of the Serbian nationalist group known as the Black Hand, emerged from the crowd and fired on the Archduke and his wife in their vehicle, killing them instantly (Levinson, 2005; Bogosian, 2015).

In the days following the attack, the impact of the event was seen in newspapers throughout the world. The British newspaper, *The Morning Post*, declared that the assassination of the Archduke was an act of aggression that "was to serve as a pretext for the assassination of a nation" (Watt, 1971, p. 246). Historians maintain that the Archduke's assassination was the single event that triggered World War I (Lebow, 2000). The murder of the Archduke illustrates how one assassination event can change history. Given the unique effect that an assassination can have, it is important to examine the phenomenon to develop measures to thwart these attacks. The branch of criminology known as environmental criminology, along with the SCP approach, appears to be well suited for this task.

Environmental criminology calls for analyzing the environment to reveal factors that facilitate the commission of a specific crime (Wortley and Mazerolle, 2013). Environmental criminology informs the SCP approach. This approach maintains that situational measures that reduce opportunities can be identified and implemented to prevent a specific crime from occurring (Clarke, 2013). Given that criminologists have successfully examined terrorism through the lens of environmental criminology and SCP (Clarke and Newman, 2006; Freilich and Newman, 2009), it is surprising that criminology has yet to apply this framework to assassinations, a tactic often used by terrorists. This paper therefore fills a gap in the existing assassination, terrorism, and criminology literature by applying SCP to assassinations conducted by terrorists.

This paper begins by defining assassinations. Next, we provide a brief historical background on the assassination tactic as well as an overview of the literature. Third, we review environmental criminology and SCP and their application to terrorism. We then devise seven hypotheses to explain successful assassinations. Fourth, we discuss our data, methods, and results. We conclude by addressing the implications of our findings and how they could be used to devise policies that prevent assassinations performed by terrorists. We also provide recommendations for future research.

Defining "Assassinations"

This paper uses data from the Global Terrorism Database (GTD) and adopts its definitions of terrorism and assassination. The GTD defines an assassination as "an act whose primary objective is to kill one or more specific, prominent individuals" that is "usually carried out on persons of some note, such as high-ranking military officers, government officials and celebrities." (GTD, 2015, p.22). The GTD emphasizes that assassinations do not include attacks on non-specified members of a targeted group.

Assassinations included in the GTD must align with the GTD's definition of terrorism, defined as "the threatened or actual use of illegal force and violence by a non-state actor to attain a political, economic, religious, or social goal through fear, coercion, or intimidation" (p. 8). The GTD's inclusion criteria also require that two of the following criteria are satisfied: "1) The act must be aimed at attaining a political, economic, religious, or social goal, 2) There must be evidence of an intention to coerce, intimidate, or convey some other message to a larger audience (or audiences) than the immediate victims, 3) The action must be outside the context of legitimate warfare activities" (p. 9). Importantly, the GTD considers an assassination to be successful when the intended target is killed. If an attack kills others but does not kill the intended target it is considered unsuccessful.

Assassination Background

The term “assassin” is rooted in a fringe Shi’a Muslim terrorist group that operated in Iran and Syria between 1090 and 1272 (Hoffman, 1995). The sect fought both the Christian Crusaders and Sunni Muslims to further their political goals (Hassan, 2006; Leiden, 1969; Lewis, 2008). Some argue that this Ismaili Shi’a sect were some of history’s first terrorists (Lewis, 2008). These assassins were promised to go to heaven should they die carrying out their attacks, similar to the “suicidal martyrdom” beliefs of some modern day Islamist terrorist organizations (Hoffman, 1995, p. 271-272). The tactic of assassination benefited from advances in weapons technology during the 19th century’s Industrial Revolution. These technological improvements made attacks easier to carry out and more deadly (Bogosian, 2015). The development of the machine gun, handgun and explosives assisted revolutionaries in their use of assassinations to inflict political change. Weapons such as these helped the People’s Will, a left-wing Russian group, successfully assassinate Tsar Alexander II in 1881. They also assisted the Bolsheviks in killing Tsar Nicholas II decades later (Bogosian, 2015).

Crotty’s (1998) typology of U.S. assassinations expands upon the connection between terrorism and the tactic. Indeed, one of Crotty’s five assassination categories includes terroristic assassination. Crotty (1998) explains that terroristic assassinations are used by both governments to suppress insurgents, as well as revolutionary and organized groups to weaken governments. For example, the Nazis frequently employed assassinations during World War II and the Viet Cong used this tactic during the Vietnam War (Crotty, 1998). Hauner (2007) argues that terroristic assassinations can be the most effective method available to challengers, citing how the practice was used to kill Julius Caesar in ancient Rome. During the 19th century, revolutionary Russians often carried out terroristic assassinations (Gross, 1969). It was during this time that political assassinations evolved from isolated acts to politically motivated terror where assassins systematically targeted prominent individuals (Gross, 1969).

Ben-Yehuda (1990) argues that assassinations should be studied as *a distinct analytical entity*. He notes that an assassination targets a *specific individual*, while other types of terrorist attacks usually target broad categories of people (Ben-Yehuda, 1990). Ben-Yehuda (1990) argues that most researchers have not fully noted the distinction between the target of an assassination and other types of terrorist attacks. Importantly, criminologists have yet to disaggregate terrorism to focus specifically on assassinations. One reason criminologists may have ignored assassinations is that like terrorism, it is a challenging topic to study (Ben-Yehuda, 1990). Ben-Yehuda’s argument to disaggregate assassinations from terrorism aligns with the SCP approach, which emphasizes the need to examine specific forms of crimes rather than broad crime categories to best inform prevention measures. Clarke and Newman (2006) similarly maintain that SCP should be applied to specific forms of terrorism rather than terrorism in general.

Assassination Literature

Much of the assassination literature is based in the fields of political science, psychology and history (Ben-Yehuda, 1990). It mostly focuses on the political and cultural impact of assassinations within countries, as well as the psychological impact of attacks on individual citizens. In addition, studies usually examine the individual-level characteristics of assassins (i.e., psychological and behavioral factors) that motivated them to commit the assassination. Thus, the literature tends to ignore the environmental and situational factors that facilitate attacks.

Assassinations can lead to extensive political and cultural consequences within the attacked a country, as well as international repercussions (Crotty, 1998; Unsgaard and Meloy, 2011). One example is the 1993 assassination of Burundi president Melchior Ndadye that triggered a civil war lasting almost 15 years where hundreds of thousands of civilians were murdered (Appleton, 2000; Bundervoet, 2009). Many scholars have noted that assassinations can have a culturally traumatic impact if a nation's identity is threatened (Childers, 2013). The assassinations of American presidents Kennedy, Lincoln and McKinley, for instance, triggered a cultural trauma within the United States (Childers, 2013; Schwartz, 1991).

Many researchers have found that assassination events can traumatize a nation. Political assassinations in particular can evoke many different emotional responses among citizens who feel threatened by the attack (Varma *et al.*, 1989). One often cited example is the assassination of U.S. president John F. Kennedy. Researchers have found that Kennedy's death shocked the American public, with many citizens feeling depressed following his murder (Ebel-Lam *et al.*, 1984; Freedman, 1984). Similarly, researchers found that the 1995 assassination of Israeli Prime Minister Yitzhak Rabin traumatized the Israeli population (Klingman, 2001; Zelig and Nachson, 2012).

Assassination studies have frequently analyzed individual factors motivating assassins. In the U.S., scholars have found that psychologically unstable individuals committed most of the assassinations against U.S. government officials, especially presidents (Clarke and Lucente, 2003; Meloy *et al.*, 2004). It is this characteristic that differentiates presidential assassinations in the United States from those in other countries (Crotty, 1998). For example, John Hinckley, the attempted assassin of President Reagan, suffered from both mental instability and social isolation (Goldstein, 1981; Rosenzweig, 1981). Similarly, the individual who attempted to assassinate President Clinton had a history of emotional and mental instability (Clarke and Lucente, 2003).

Although the current literature lacks a focus on the assassination event itself, a few studies have examined assassination incidents. For example, Nice (1994) analyzed American presidential assassination events to uncover why some presidents have been targeted for assassination while others have not. Almost a quarter of all American presidents were targeted by an assassin. Targeted Presidents tended to serve during partisan realignments or in the modern era that began with Franklin Roosevelt (Nice, 1994). In addition, assassins were more likely to attack presidents serving during a war (Nice, 1994). Iqbal and Zorn (2006) empirically examined assassination incidents of heads of state between 1946 and 2000. Looking at institutional and sociopolitical factors, they found that assassinations were related to how a leader took and stayed in office, the amount of power, and the level of repressiveness the leader exerted in office (Iqbal and Zorn, 2006).

In sum, the literature mostly ignores the environmental and situational factors that facilitate assassination incidents. This paper begins filling this gap by analyzing assassination events through an environmental criminology and SCP perspective.

Literature Review & Hypotheses

This section reviews the literature on environmental criminology, SCP and terrorism to devise hypotheses to determine whether situational elements are associated with successful assassinations.

Criminologists have understudied political assassinations. The lack of criminology studies examining assassinations is unsurprising given the field has been slow to embrace the study of terrorism and political violence (Freilich and LaFree, 2015; Felices-Luna, 2010; LaFree and Hendrickson, 2007). While some scholars argue that terrorism and political violence lie beyond the domain of criminology (Felices-Luna, 2010), criminology's gradual embrace of terrorism may be due to the difficulty in defining and measuring this phenomenon (Freilich and LaFree, 2016; LaFree *et al.*, 2015; Schmid and Jongman, 2005). There is currently no universally accepted terrorism definition (Freilich *et al.*, 2009; LaFree *et al.*, 2015; Schmid and Jongman, 2005). It is challenging to measure terrorism since traditional data collection methods like victimization surveys, self-report data, and official data can be difficult to acquire and each possesses unique limitations and biases (Freilich and LaFree, 2016; LaFree *et al.*, 2015). In response to these data challenges, researchers rely on open-source terrorism event databases like the Global Terrorism Database (GTD) (LaFree *et al.*, 2015). Open source event databases have enabled researchers to apply theories of criminology to the study of terrorism (Freilich *et al.*, 2015).

Environmental Criminology and Situational Crime Prevention (SCP)

Environmental criminology is increasingly being used to study terrorism. Environmental criminology stresses the importance of the crime event in examining the opportunities that facilitate the crime's occurrence. In comparison, traditional criminological theories tend to emphasize the offender and distal causes of crime (Wortley and Mazerolle, 2013). Studying the interaction between the offender and his/her environment assists in the formulation of effective prevention measures (Wortley and Mazerolle, 2013). Environmental criminology is influenced by three opportunity theories: routine activities, rational choice, and crime pattern (Clarke, 2013). Routine activities theory maintains that crime occurs when three key elements intersect in place and time: a likely offender, a suitable target, and the absence of a capable guardian (Cohen and Felson, 1979; Felson and Cohen, 1980). Routine activities theory also discusses the importance of handlers for offenders and place managers for locations. Key to rational choice theory is the notion that criminal behavior is purposive and rational. In addition, there are different stages of criminal involvement (Clarke and Cornish, 1985; Cornish and Clarke, 1987; Cornish and Clarke, 2013). Offender decision-making is also crime-specific (Clarke and Cornish, 1985; Cornish and Clarke, 1987; Cornish and Clarke, 2013). Crime pattern theory stresses that crime does not occur randomly. Instead, crime occurs when the environment of both the offender and victim converge. Crime is also concentrated geographically in "hot spots" (Brantingham and Brantingham, 1981; Brantingham and Brantingham, 1993; Brantingham and Brantingham, 2013).

SCP is influenced by all three of these crime opportunity theories (Clarke, 2013) and it seeks to alter the environment surrounding a criminal event to remove the opportunities and thereby prevent the crime (Clarke, 2013). SCP, like environmental criminology, emphasizes the need for crime prevention measures to be directed towards specific forms of crime instead of general categories of crime (Clarke 1995; Clarke and Newman, 2006; Clarke, 2013). Sometimes only one small element of a criminal opportunity needs to be eliminated for a crime to be successfully prevented (Clarke, 2013). Cornish's (1994; see also Clarke, 2013) crime scripts approach highlights how several steps are involved in the crime commission process. Cornish (1994) maintains that crime scripts can be developed to explain how offenders make decisions during the crime commission process. By understanding how a crime unfolds, specific crime prevention measures can be developed and utilized at different crime stages.

Cornish and Clarke's (2003) most recent formulation of SCP includes 25 techniques for disrupting crime opportunities and offender motivation cues. They proposed 5 techniques for each of the 5 main subjects of 1) Increasing the effort, 2) Increasing the risks, 3) Reducing the rewards, 4) Reducing provocations, and 5) Removing excuses. Examples of techniques that fall into the "increase the effort" heading include target hardening, while those directed toward "increasing the risks" include extending guardianship and strengthening formal surveillance (Cornish and Clarke, 2003; Clarke, 2013). Techniques for reducing offender rewards include removing and concealing targets, while those directed towards reducing provocations include neutralizing peer pressure and avoiding disputes (Cornish and Clarke, 2003; Clarke, 2013). Examples of techniques for removing excuses include setting rules and posting instructions (Cornish and Clarke, 2003; Clarke, 2013).

A growing number of terrorism studies in criminology have successfully applied the environmental criminology and SCP perspectives (Clarke and Newman, 2006; Freilich and Newman, 2009). Scholars argue that reducing opportunities for terrorism has direct implications for foreign policy and counterterrorism interventions (Newman 2009; Lum and Koper, 2011). Clarke and Newman (2006) extended Cornish and Clarke's (2003) 25 techniques of situational prevention to apply to terrorism. They created the "Four Principles of Situational Prevention and Four Pillars of Opportunity for Terrorism." The "Four Pillars of Opportunity for Terrorism" consist of facilitating conditions, targets, weapons, and tools opportunity. The "Four Principles of Situational Prevention" include increasing the effort and risks for terrorists, reducing their rewards, and reducing their provocations and excuses (Clarke and Newman, 2006). Newman and Clarke (2010) explain that target opportunities for terrorists exist if the target is symbolic or easy to contact. Weapons opportunities exist when terrorists are familiar with certain weapons or when some weapons are suitable for specific types of attacks (Newman and Clarke, 2010). Opportunity tools are items that facilitate attacks like cars; facilitating conditions are societal factors that enable terrorism such as sympathetic communities (Newman and Clarke, 2010).

Studies have applied environmental criminology and SCP to a variety of terrorism types such as bioterrorism (Clark, 2009), kidnapping of hostages (Yun, 2009), explosive attacks on railways (Meyer, 2012), airplane hijackings (Fahey *et al.,* 2012), and suicide bombings (Clarke and Newman, 2006). The examination of terrorism patterns has also proved informative (Rossmo and Harries, 2011; Medina *et al.,* 2011). Rossmo and Harries (2011) found that terrorists are rational when choosing locations for their cells by selecting locations close to their targets. Several terrorism studies have applied Cornish's (1994) crime scripts approach to law enforcement killings committed by U.S. far-right extremists (Freilich and Chermak, 2009), terrorist kidnappings in Afghanistan (Yun, 2009), and explosive attacks on railways (Meyer, 2012). Clarke and Newman (2006) also used crime scripts in their study of suicide bombers to determine measures for disrupting attacks.

Hypotheses

Clarke and Newman (2006) created the acronym MURDEROUS to describe how terrorists choose weapons that are Multipurpose, Undetectable, Removable, Destructive, Enjoyable, Reliable, Obtainable, Uncomplicated, and Safe (Clarke and Newman, 2006). Aligning with this conceptualization of terrorist weapon selection, LaFree *et al.* (2015) find that terrorists rely on weapons that are readily available, unsophisticated and easy to use. Similarly, Newman and Clarke (2010) find that terrorists often base their activity on what is easiest rather than their ideology. In their development of the weapons opportunity pillar, they argue that weapons opportunities are present when terrorists are familiar with particular weapons or find certain weapons to be more appropriate than others to carry out a successful attack.

The applicability of SCP to terrorist weapon selection in assassinations can be seen in Unsgaard and Meloy's (2011) discussion of the U.S. Secret Service's Exceptional Case Study. This project analyzed assassination attacks against U.S. public figures between 1949 and 1996, and found that a firearm was utilized in 81% of events. Bogosian's (2015) discussion of the new technologies developed during the Industrial Revolution further supports the notion that assassins choose weapons that are familiar, easy to use, and efficient. The availability and accuracy of handguns also dramatically improved during the Industrial Revolution (Bogosian, 2015). As a result, assassins were able to carry out more successful attacks. Considering this literature, this paper's first hypothesis states that *attacks that use firearms, as opposed to explosives, are more likely to result in a successful assassination (H1).* The corresponding independent variable for this hypothesis is the "Firearms" variable which measures whether the terrorists used explosives (0) or firearms (1) during the attack.

SCP also explains terrorist target selection. Clarke and Newman (2006) developed an acronym known as EVIL DONE to identify the most vulnerable targets for a terrorist attack. The authors specify that targets are at risk if they are Exposed, Vital, Iconic, Legitimate, Destructible, Occupied, Near and Easy. They even explain how the EVIL DONE classification can identify which targets are most vulnerable for assassinations (Clarke and Newman, 2006, p. 101-102). They emphasize that terrorists seek out symbolic targets that are easy to approach. There are extensive examples of symbolic political assassinations where the targets were made vulnerable by their public exposure (Lebow, 2000; Nice, 1994). For example, U.S. President John F. Kennedy was killed while seated in an open car, which facilitated the attack's success. Overall, government officials tend to have more protection (like security details) than individuals unaffiliated with the government. In light of the security resources that government officials have over private citizens, this paper proposes that *attacks that focus on official targets (i.e., targets affiliated with the government), thought to be better protected, are less likely to result in a successful assassination than attacks that focus on non-official targets (H2).* This hypothesis is represented by the "Official Target" dichotomous independent variable (0 = unofficial target and 1 = official target).

Clarke and Newman (2006) also discuss the effectiveness of suicide attacks, explaining that suicide terrorism is more deadly than non-suicide terrorism. In particular, suicide terrorist attackers may be more effective in reaching their targets (Benmelech *et al.,* 2012; Crenshaw, 2007; Gambetta, 2006; Hassan, 2001; Hoffman, 2003). Hard targets, like some public officials, are thought to be more difficult to reach because they are better protected compared to soft targets. For example, certain government officials can have armed guards on duty. Attacking a hard target instead of a soft target could therefore increase the likelihood of the terrorists being killed during an attack. These circumstances often lead attackers to choose to commit a suicide attack where there is no need to plan an escape, no need to worry about capture and confession, and no need to devise strategies to safeguard the attacker from harm or death. Suicide attackers have even been described as the ultimate smart bomb, because they are particularly effective at reaching their targets (Hoffman, 2003). Collard-Wexler *et al.* (2014, p. 631) conclude that “suicide attacks are effective at penetrating hardened targets and inflicting heavy damage which is why hard targets encourage more suicide attacks.” Based upon these argument’s this paper’s third hypothesis is that *suicide attacks are more likely to result in a successful assassination than non-suicide attacks (H3).* The “Suicide” dichotomous independent variable indicates whether the assassination was a suicide attack (1) or not (0).

Medina *et al.* (2011) analyzed the spatial distribution of terrorist attack incidents compared to attack intensity (i.e., the sum of fatalities, injuries and hostages) in Iraq. They found population density to be associated with more terrorist attacks, but not with more intense (i.e., deadly) attacks. They note that the relationship between population density and attack incidents is expected, because more people in an area indicate more terrorists are also present. In addition, more terrorist attacks are likely to occur in areas with a higher population density because terrorists seek to enhance the success of their attacks by choosing areas with more people. Thus, there are more target opportunities in areas with a high population density (Medina *et al.,* 2011). Terrorist attacks can be associated with areas having a high population density because these areas contain symbolic targets and opportunities for inflicting mass casualties (Harries, 2006). Rossmo and Harries (2011) find that terrorists rationally choose their targets and select locations with desirable targets that are easy to access. Terrorist cells sometimes operate in a particular city for the sole purpose of attacking a symbolic target (Rossmo and Harries, 2011). Terrorists also seek to attack symbolic targets that will garner media attention (Clarke and Newman, 2006). Since symbolic targets are often located in cities and as a result have more people present (i.e., the London and Mumbai transportation systems), terrorists can benefit by causing many fatalities. The SCP literature emphasizes that terrorists often seek to attack occupied targets to cause more deaths. Clarke and Newman (2006) explain that this why terrorists rarely attack infrastructures which are often unoccupied. Given the fact that the definition of a successful assassination indicates that at least one individual must be killed, hypotheses four and five propose the following: *There is a positive relationship between the number of fatalities an assassination attack causes and the likelihood of success of that assassination attack (H4); There is a positive relationship between the number of injuries an assassination attack causes and the likelihood of success of that assassination attack (H5).* The corresponding independent variable for H4 is “Total Fatalities”, a continuous measure of the total number of deaths resulting from an assassination. For H5, the “Total Injuries” variable is a continuous measure of the total number of injuries occurring during an attack.

As discussed above, research has found an association between population density and the frequency of terrorist attacks. Since cities tend to have a higher population density compared to surrounding areas, we hypothesize that *attacks that occur within a city, as opposed to its immediate vicinity, are more likely to result in a successful assassination (H6).* This hypothesis is represented by the “Vicinity to City” independent variable, where 0 indicates that the assassination occurred inside the city itself, and 1 indicates that it occurred in the immediate vicinity of the city.

Several researchers have noted the link between SCP and the selection of destructible targets by eco-terrorists. Eco-terrorists choose targets where they can inflict extensive property damage because their goal is to destroy facilities and harm the property of blameworthy parties, such as businesses that harm the environment or animals (Gruenewald *et al.,* 2015). Leader and

Probst (2003) explain how the Earth Liberation Front (ELF) does not seek to murder large numbers of people. Instead, their goal is to inflict substantial property and economic damage. Many have detailed the property damage and financial effects that both ELF and ALF have inflicted in the United States (Freilich *et al.*, 2009; Smith and Damphousse, 2009). In fact, it is estimated that eco-terrorists have caused roughly $100 million in damages in the U.S. over the past few decades (Gruenewald *et al.,* 2015). Although it is an explicit goal of environmental and animal rights extremist groups in the US to destroy property, other types of terrorist groups also benefit from perpetrating such damage. As Clarke and Newman (2006) note in their discussion of target attractiveness in EVIL DONE, many terrorist groups benefit from causing mass casualties and destruction. More destructive and deadly attacks usually result in more media coverage, thus increasing the terrorists' rewards (Clarke and Newman, 2006).

The property damage resulting from an attack could also be indicative of an assassination's destructiveness in terms of fatalities and injuries. The presence of property damage could suggest that the terrorists did not encounter challenges and were able to implement their attack as planned. For example, if no damage occurred, perhaps the vehicle carrying the target was able to evade the terrorists by speeding away, preventing a successful assassination. The following and final hypothesis is proposed: *attacks that cause property damage are more likely to result in a successful assassination than attacks that do not result in property damage (H7).*The corresponding variable for this hypothesis is the "Property Damage" variable (0 = no property damage, 1 = property damage).

Since scholars have noted how the study of terrorism has historically neglected empirical data and statistical analyses (LaFree *et al.*, 2015), this paper will contribute to the field by providing a statistical analysis of assassinations conducted by terrorists over thirty years.

Data

Our analysis includes a total of 7 independent variables: Official Target (0=unofficial, 1=official), Firearms (0=explosives, 1=firearms), Suicide (0=no, 1=yes), Total Fatalities, Total Injuries, Property Damage (0=no property damage, 1=property damage), and Vicinity to City (0=inside city, 1=in vicinity of city). In addition to these predictor variables, a control variable for attack year is used (Year) along with a categorical variable (Region) indicating the region the attack took place (0=Middle East & North Africa, 1=North America, 2=Central America & Caribbean, 3=South America, 4=East Asia, 5=Southeast Asia, 6=South Asia, 7=Central Asia, 8=Western Europe, 9=Eastern Europe, 10=Australia & Oceania, and 11=Sub-Saharan Africa).

Again, we use assassination data from the GTD, maintained by the National Consortium for the Study of Terrorism and Responses to Terrorism (START) at the University of Maryland. The GTD is a freely available terrorism resource and is updated every year, recording information for every known terrorist attack since 1970 (LaFree and Dugan, 2007; LaFree *et al.*, 2015). The GTD is the first global dataset to contain both domestic and international terrorist attacks (Endlers, Sandler, and Gaibulloev, 2011). This characteristic makes the GTD more reliable than other databases such as ITERATE or terrorism data from the U.S. State Department, which often only contain international attacks (Endlers, Sandler, and Gaibulloev, 2011). In addition, the TWEED (Terrorism in Western Europe: Event Data) study only covers internal attacks for 18 European countries from 1950 to 2004 (Endlers, Sandler, and Gaibulloev, 2011).The GTD's broader inclusion criteria (of domestic attacks) and longer time period makes it more reliable than competing sources. The GTD codes for different attack types (like assassination, hijacking, kidnapping, etc.) which allows researchers to filter the database to focus on specific types of attacks, like assassinations. When filtered to only include assassinations, the GTD contains almost 17,000 incidents. The database codes for around 120 variables, including the total number of fatalities and injuries resulting from an incident, the weapon types used in an attack, the name of the group responsible for the attack, the different types of targets present in an attack, whether property damage occurred, and the location of the incident (GTD, 2015).

As discussed, once an incident is determined to align with the GTD's terrorism definition, it must satisfy the assassination definition to be coded as one. The GTD's assassination definition requires that the target be a specific individual, as opposed to broad categories of people (i.e., Americans). If the goal of an attack is to murder a prominent politician, but the strike fails to kill the named individual (even if others are killed), it is coded as an unsuccessful assassination. The same holds true if the intended target is injured but not killed.

The GTD also has some limitations. First, since it is an open source event database, it is limited to publicly reported information. Another potential issue is that the GTD not only codes for the primary (i.e., main) attack type, but also for secondary and tertiary attack types. This means that an assassination can be paired with other attack types such as bombings or kidnappings. However, a preliminary analysis of the data reveals that out of almost 17,000 assassinations between 1970 and 2014, only 169 are considered secondary attack types, while only 4 are coded as tertiary attacks. Since the definition of a successful attack in the GTD is tied to the primary attack type, including secondary and tertiary assassinations would mean that those cases would have to be recoded depending on whether the assassination was successful, rather than referring to the success of whichever attack type (like bombings, firearms, kidnappings) was considered the primary attack type. For this paper, only attacks where the primary attack type is an assassination are considered. Future research can include incidents where the secondary and tertiary attack types are coded as assassinations.

Descriptive Statistics

We ran descriptive statistics on all 9 variables included in the multivariate analysis (7 independent variables, 2 control variables). A substantial portion of assassinations occurred during the 1980's and early 1990's. Towards the end of the 1990's, assassinations began to decline steeply. Around 2009, assassinations began to spike. This trend has yet to decline or level off. Importantly, these temporal trends match the trends for non-assassination terrorist attacks (Mandala, 2016).

Table 1 displays the frequencies for the variables used in this paper's analyses. With regards to the different types of targets, official targets are attacked slightly more often than unofficial targets. The threat of assassination is therefore almost equally distributed between official and unofficial targets Official targets include government and diplomatic officials, police and military affiliated individuals. Unofficial targets include those individuals who are unaffiliated with the government like private citizens and tourists. Table 1 indicates that firearms (72%) are the most common type of weapons used in assassinations, followed by explosives. It further shows that suicide bombs account for a very small portion of assassinations (1%). We can also see that the majority of attacks do not result in property damage (at 83%). The vast majority of assassinations also occur inside a city as opposed to the immediate vicinity of a city. From Table 1, we can see that most assassinations were successful in murdering the intended target (78%) compared to 22% that were unsuccessful. More fatalities have also occurred from attacks compared to injuries. Lastly, this table displays the distribution of assassination incidents among different regions in the world. The most frequently attacked regions include: the Middle East & North Africa, South Asia, Western Europe, and South America.

<Insert Table 1 about here>

Bivariate Analyses

Several bivariate analyses were conducted. Table 2 shows the results of 2 t-tests run between 1) successful assassinations and total fatalities, and 2) successful assassinations and total injuries. There is a statistically significant mean difference in total fatalities between successful and unsuccessful assassinations, where $t(5{,}827) = -32.99$, $p < .05$. Successful assassinations tend to have more fatalities (M=1.6, SD=1.8) than unsuccessful assassinations (M=0.5, SD=1.7). There is also a statistically significant mean difference in the total injuries between successful and unsuccessful assassinations, where $t(8{,}116) = 11.91$, $p < .05$. Results indicate that successful attacks tend to have fewer injuries (M=0.5, SD=6.3) than unsuccessful attacks (M=1.6, SD=4.4). These results are interesting considering how this paper hypothesizes that more injuries are associated with successful attacks.

<Insert Table 2 about here>

Significant results were also found for several chi square tests, as displayed in Table 3. Specifically, chi square results indicate a statistically significant difference between weapon type and successful assassinations, with a moderate to strong effect size. Successful assassinations are more likely to involve firearms than explosives, while unsuccessful assassinations are roughly evenly split between explosives and firearms. Results also show a significant difference between suicide bombs and successful assassinations, with a weak effect size. Specifically, successful and unsuccessful assassinations tend to not involve suicide bombs. A significant difference between property damage and successful assassinations was also found, with a moderate effect size. Assassinations, regardless of whether or not they are successful, tend to not result in property damage. Such a finding may be indicative of the fact that most assassinations are carried out using firearms, which are less likely to cause significant property damage.

<Insert Table 3 about here>

Multivariate Analysis

We ran a binary logistic regression model to determine the effects of these different variables on successful assassination events. The dependent variable is the dichotomous variable representing successful assassinations (1=successful, 0=unsuccessful), indicating that a logistic regression is statistically appropriate. Assassinations are coded as successful only if the intended target is killed. As noted, a total of 7 independent variables are used in the analysis, along with 2 control variables.

Results

Table 4 displays the results from the binary logistic model. The model is significant ($\chi 2 = 5{,}149.89$, $p < .001$) and explains roughly 48.6% of the variance in successful assassinations. A total of 5 independent variables are significant: Official Target, Firearms, Suicide, Total Fatalities, and Total Injuries. A total of 2 control variables are significant: Year and Region

(Central America & Caribbean, South America, and Sub-Saharan Africa). The remaining regions are insignificant, along with the Property Damage and Vicinity independent variables. Total Fatalities appears to be the variable with the most impact on the model (Wald = 1,584.36). Three of our hypotheses (H1, H2, and H4) are supported while four are not (H3, H5, H6, and H7). Interestingly, for two of our hypotheses, we found the opposite of what was predicted. As predicted in H2, successful assassinations are 34% less likely when officials are targeted compared to unofficial individuals ($\beta = -0.42$, OR=0.66). Also as predicted in H1, successful assassinations are 2.9 times more likely to occur when firearms are used compared to explosives ($\beta = 1.06$, OR=2.89). Contrary to what was proposed in H3, successful assassinations are 97% less likely to occur when the incident is a suicide attack ($\beta = -3.5$, OR=0.03). In line with what was hypothesized in H4, successful assassinations are 6.2 times more likely the more fatalities that occur ($\beta = 1.82$, OR=6.17). However, contrary to H5, successful assassinations are 30% less likely the more injuries that occur ($\beta = -0.35$, OR=0.70). In addition, successful assassinations are 1.6 times more likely to occur in the Central American and Caribbean region compared to the Middle East ($\beta = 0.47$, OR=1.61). Successful assassinations are also almost 2 times more likely to occur in South America compared to the Middle East ($\beta = 0.68$, OR=1.98), and 1.4 times more likely to occur in Sub-Saharan Africa compared to the Middle East ($\beta = 0.34$, OR=1.4). We see that for each additional year, successful assassinations are 3% less likely ($\beta = -0.03$, OR=0.97).

<Insert Table 4 about here>

Discussion

This paper examines whether situational factors are associated with successful assassinations performed by terrorists. The findings suggest that an approach framed in environmental criminology and SCP can help inform practical measures that will prevent successful attacks. These findings have important implications for policy makers and practitioners. Future research can build upon these results to tease out additional situational elements that may be influencing successful assassinations and thus further inform prevention efforts.

The findings support Hypothesis 1, which states that *attacks that use firearms, as opposed to explosives, are more likely to result in a successful assassination.* This result suggests that firearms are the most effective and suitable weapons for murdering specific individuals. By comparison, explosives are probably more effective if the goal is to obtain mass casualties. The use of firearms to murder particular individuals is illustrated by the fact that left-wing terrorist organizations often used firearms to carry out surgical attacks. Further, this finding suggests that while it is important to have prevention measures in place that are directed towards explosives, measures must focus on firearms when the goal is to prevent successful assassinations. Considering Clarke and Newman's (2006) MURDEROUS acronym, firearms could be the weapons of choice for assassinations because they are easily removable, undetectable, uncomplicated and destructive. Research also maintains that the most important weapon attribute for terrorists is obtainability (Clarke and Newman, 2006). Given the availability of firearms, terrorists can easily obtain and familiarize themselves with these weapons. A variety of situational measures can be implemented to prevent assassinations that use firearms. For example, policies that track and limit firearm sales can assist in increasing the effort and risks involved for terrorists. In addition, having vulnerable targets wear protective bulletproof vests can increase the likelihood of an attack being unsuccessful and reduce the rewards for terrorists.

Bulletproof glass can be installed on the cars of potential targets to limit the likelihood of an assassination being successful. This would also help reduce the rewards involved for terrorists.

The results support Hypothesis 2, which predicts that *attacks that focus on official targets (i.e., targets affiliated with the government), thought to be better protected, are less likely to result in a successful assassination than attacks that focus on non-official targets.* This finding could indicate that official targets have more resources to protect themselves compared to unofficial targets. If we use Clarke and Newman's (2006) EVIL DONE acronym that rates target attractiveness, we would find that official targets are not as easily destructible or exposed as unofficial targets given the security measures they have in place. For instance, political officials like prominent diplomats or prime ministers are more likely to have security details that offer protection. They are also more likely than unofficial targets to have systems in place to protect and monitor their homes and offices. This finding highlights the need for unofficial targets to implement security measures if they are vulnerable to attacks. While unofficial targets (i.e., civilians) may not have the resources to obtain their own private security details, there are other less costly preventive measures that they can take to protect themselves. For example, if a terrorist group threatens an unofficial target, that individual can install surveillance and alarm systems in their home and office. In addition, they can limit their time spent outside and among crowds without any protection. These individuals can also take precautions in their everyday routines to prevent against an attack. For example, they can wear a bulletproof vest, and change their daily route to and from work to limit the ability of terrorists to become familiar with their travel patterns. This increases the risks and effort involved for terrorists, as uncertainty is introduced when they attempt to locate and attack their target.

Findings do not support Hypothesis 3, which posits that s*uicide attacks are more likely to result in a successful assassination than non-suicide attacks.* In fact, the results find that successful assassinations are *less* likely when the incident is a suicide attack. This finding is surprising considering how suicide terrorism is more deadly than non-suicide terrorism (Clarke and Newman, 2006). We wonder if this finding is because suicide attacks often involve explosives. As discussed, successful assassinations are less likely when explosives are used compared to firearms. It may also be more difficult for suicide attackers to gain access to vulnerable targets. For example, suicide attackers may stand out, especially if they have to move through security measures like metal detectors or CCTV surveillance to reach the target. This finding also bolsters a core SCP claim, the need to shy away from a one size fits all approach and to instead focus on specific types of terrorism because opportunities and the corresponding interventions will differ across crime types (such as the gun versus explosive attacks just discussed).

The results also support Hypothesis 4, which states that *there is a positive relationship between the number of fatalities an assassination attack causes and the likelihood of success of that assassination attack.* The fatalities variable, in fact, had the largest impact on the model. This makes sense considering the definition of a successful assassination, where at least one individual has to be killed (the target) for the attack to be considered successful. This finding also speaks to the need to implement target-hardening measures to reduce the rewards involved for terrorists. As Clarke and Newman (2006) maintain, the most effective approach for reducing the rewards for terrorists is to implement protective measures that make attacks unsuccessful. Such measures can include CCTV surveillance, metal detectors, protective windows, and bag searches in buildings where vulnerable targets are located. Tracking firearm sales, having vulnerable targets wear bulletproof vests, and hiring security details can help reduce the likelihood of an assassination's success. Other potential measures can include closing streets around where targets live or travel as well as installing barriers, fences, or even walls in front of buildings where targets are located. Authorities can also quickly clean up the scene of an assassination attack to reduce terrorists' rewards (Clarke and Newman, 2006).

Interestingly, our results do not support Hypothesis 5, which states that *there is a positive relationship between the number of injuries an assassination attack causes and the likelihood of success of that assassination attack.* In fact, the results show that successful assassinations are less likely when more injuries occur. While this finding is unexpected, it perhaps indicates that more injuries occur when terrorists miss their intended target and instead injure bystanders by mistake. This finding highlights the need to consider measures that protect individuals surrounding a target, rather than just the target. While this is a common-sense strategy, it may not always be a top priority if the focus is only on protecting a high-ranking official thought to be at risk for an assassination attempt. One measure that could protect bystanders from injury during an assassination is limiting the proximity of outsiders to vulnerable targets (like prominent politicians). For example, public officials like presidents or the Pope often like to interact with the public. However, if there are substantiated threats against them, these types of interactions should be limited. To limit these interactions, a specified distance can be maintained between the public and the official. Law enforcement can also set up security check points and bag searches when the official is expected to interact with the public at a certain location. Some events that occur both indoors and outdoors, like speeches, require members of the public to purchase tickets in advance to attend the event. At these types of events, limitations can be placed on the types of bags that individuals are allowed to bring to the location. For example, in June 2013, the National Football League (NFL), following the lead of many tennis tournaments like the U.S. Open, implemented a new policy restricting the types of bags allowed into its stadiums.[I] This policy prohibits all backpacks and camera bags, and only clear bags no larger than 12" x 6" x 12" are permitted. The NFL acknowledges that this policy was partly implemented in response to the Boston Marathon bombings of 2013. Precautions such as these would not only protect the target against an assassination, but also bystanders that could be injured during an attack.

Unexpectedly, Hypotheses 6 is not supported. Hypothesis 6 posits that *attacks that occur within a city, as opposed to its immediate vicinity, are more likely to result in a successful assassination.* Perhaps successful assassinations are not associated with property damage because most attacks are carried out using firearms. Specifically, less property damage usually results from attacks when firearms are involved compared to explosives. We predicted in Hypothesis 7 that successful assassinations would be more likely within the city as opposed to its immediate vicinity given that cities tend to be more populated than the surrounding areas. However, this was not supported, perhaps because assassinations have different goals than other types of terrorist attacks. In an assassination, the primary goal is to kill one specific person, while other attacks seek to kill as many people as possible. Other types of terrorist attacks might take place more often in densely populated areas (i.e., within cities) to kill as many people as possible. Conversely, assassins may focus on areas where they can most easily attack the target successfully, regardless if that area is densely populated or not.

The findings also reveal that different regions are more likely to experience successful assassinations compared to the Middle East (which is the region that experienced the most assassinations). Successful assassinations are more likely in Central America, the Caribbean, South America and Sub-Saharan Africa than they are in the Middle East. This further highlights the need to study assassinations even more narrowly. This could help determine if situational factors associated with successful attacks differ by region. This also has direct implications for prevention, as measures can be tailored specifically to different regions.

One interesting finding is that successful assassinations have become less likely over time. This might mean that while terrorist attacks overall have increased and become more deadly recently (GTD, 2015), it has become more difficult for terrorists to successfully murder specific individuals compared to unspecified and broader categories of people. This finding could indicate that prevention measures have recently increased and/or they have become more effective when directed towards specific targets. Protecting specific persons may be easier than safeguarding large groups of people who are usually targeted in non-assassination strikes. Alternatively, this could be explained by differences in today's terrorist organizations compared to the groups that operated in the late 1980s and early 1990s. For example, the left-wing organizations that operated in the past may have been more likely to use assassination to achieve their goals than the Jihadi organizations operating today. In particular, left-wing groups often sought to pressure governments to achieve autonomy, while Islamic extremist groups, such as Al Qaeda and ISIS, appear more interested in taking over regions and implementing their own form of government. Perhaps the use of assassination is not useful for today's Jihadi groups because the tactic is less effective in helping them achieve this regional influence.

Limitations

One of the main limitations of this paper stems from the open source nature of the GTD. Since the GTD is coded from media outlets, it is biased towards those attacks that go reported in the media. More specifically, it is biased towards democracies and "newsworthy" events (LaFree *et al.,* 2015, p. 22). Events in autocratic countries like North Korea or Russia will mostly be excluded from the GTD because the Western media has limited access to information on these countries. The GTD may also include inaccuracies that go reported in the media and lack detailed information on all attacks (LaFree *et al.,* 2015). One related issue is that it may not be clear who the intended target of the assassination was, especially if the attack resulted in multiple fatalities. The GTD also does not contain incidents that were foiled before the attack was committed. As discussed, the GTD codes for up to 3 different attack types. While roughly 1% of all assassination cases between 1970 and 2014 had an assassination coded as a secondary or tertiary attack type, future studies may benefit by incorporating these cases. In addition, the GTD codes for up to 3 different target types. Thus, an assassination incident could have an official (i.e., government) target coded as its primary target type, while also having a secondary target type coded as an unofficial target (i.e., civilians). Since assassinations tend to target one individual as opposed to multiple individuals, this issue likely does not have much influence on this paper's conclusions. In fact, out of roughly 17,000 assassinations during this time period, only 397 had secondary targets coded, and 31 had tertiary targets. Thus, only 2.5% of all assassination cases had either a secondary or tertiary target type coded in the GTD. However, future studies may want to consider incorporating these secondary and tertiary target types. Another limitation is that due to a data integration issue, the GTD is missing data for 1993. This is unfortunate considering how a spike in assassinations occurred during the early 1990s. Lastly, the GTD has been criticized for excluding state-sponsored terrorist events (LaFree *et al.,* 2015).

Conclusion

Results from the analysis conducted in this paper reflect how valuable environmental criminology and SCP can be to the study of assassinations by terrorists. Findings show that various situational factors contribute to successful assassinations, such as target types, weapon types, total fatalities and injuries. Prevention measures can be developed based on the principles of SCP to increase the risks and effort involved for terrorists to carry out assassinations as well as reduce their rewards. Future research can extend these findings by examining the original open source materials used in the GTD and coding for additional situational variables that may be involved in assassinations, such as the presence of a capable guardian or attack location (i.e., inside or outside), etc. By coding for additional situational measures, future analyses can inform more specified prevention measures to help prevent against successful assassinations. Future research can also examine specific types of assassinations to determine if assassinations that target different types of individuals (officials or non-officials) or use particular weapons (explosives or firearms) are associated with different types of situational elements. As Clarke and Newman maintain (2006), specificity is important in developing the most effective prevention measures. Thus, by examining specific forms of assassinations, we can help develop more tailored and effective measures. Future research can also benefit by examining assassinations in different regions to see if certain measures are associated with successful attacks in particular areas.

Practical Implications

This research has practical implications for counterterrorism measures directed towards assassinations. Results are supportive of past research findings and recommendations that have been made for target-hardening measures. These recommendations also align with the SCP idea of implementing counterterrorism measures that increase the effort and reduce the rewards involved for terrorists. The framework applied in this study can assist policy makers and law enforcement practitioners in obtaining a comprehensive understanding of the opportunities that can facilitate successful assassination events. It is argued that successful attacks can be prevented and disrupted through various measures, including:

- Advising unofficial targets to take proactive measures like changing their daily routines to and from work and installing surveillance and alarm systems;
- Implementing policies that track and limit the sale of firearms to make such weapons less easily obtainable by terrorists;
- Reducing terrorists' rewards by advising vulnerable targets to wear bulletproof vests or install bulletproof glass on their vehicles
- Limiting public access to vulnerable targets to protect bystanders from potential injuries
- Reducing terrorists' rewards and increasing the effort and risks involved through target-hardening measures, like CCTV surveillance, metal detectors, entry/exit controls, traffic controls and barriers, and street closures.

This study provides insight into the features associated with successful and unsuccessful assassinations. Since this study was limited to the variables available in the GTD, future studies should identify and incorporate additional SCP variables from open source materials. This strategy will allow policy makers and practitioners to construct new and improved measures for preventing successful assassinations conducted by terrorists.

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Table 1: Assassination Descriptive Statistics, 1970-2014

	Total	Percent
Official Targets*	9,169	55%
Unofficial Targets	7,489	45%
Firearms	11,966	72%
Explosives	2,418	15%
Suicide	185	1%
Property Damage	2,179	13%
No Property Damage	13,754	83%
In Vicinity of City	710	4%
Inside City	15,947	96%
Successful	13,069	78%
Unsuccessful	3,589	22%
Total Fatalities	21,891	
Total Injured	11,815	
Region		
North America	228	1%
Central American & Caribbean	1,253	8%
South America	2,690	16%
East Asia	54	0%
Southeast Asia	944	6%
South Asia	3,300	20%
Central Asia	112	1%
Western Europe	2,903	17%
Eastern Europe	360	2%
Australia & Oceania	31	0%
Sub-Saharan Africa	1,135	7%
Middle East & North Africa	3,648	22%

*Note: Official targets include government and diplomatic officials, police, and military.

Table 2: Results of t-tests: Successful Assassinations and Total Fatalities, Total Injuries

	Successful			Unsuccessful					
	M	SD	n	M	SD	n	95% CI	t	df
Total Fatalities	1.55	1.79	13,023	0.47	1.72	3,560	-1.15, -1.02	-32.99***	5,827.11
Total Injuries	0.51	6.28	11,849	1.64	4.43	3,520	0.94, 1.31	11.91***	8,115.94

*** p < .001

Table 3: Assassination Chi Square Results, 1970-2014

		Target Type		*Suicide*		*Weapon Type*		*Property Damage*	
Groups		Official	Unofficial	Yes	No	Explosives	Firearms	Yes	No
Successful	N	6,673	6,396	82	12,987	985	10,197	1,219	11,383
	%	51.1	48.9	0.6	99.4	8.8	91.2	9.3	87.1
Unsuccessful	N	2,496	1,093	103	3,486	1,433	1,769	960	2,371
	%	69.5	30.5	2.9	97.1	44.8	55.2	26.7	66.1
Chi square =		388.85***		128.93***		2,299.75***		888.76***	
Phi =		-0.153		-0.088		0.400		0.231	

*** p < .001

Table 4: Binary Logistic Regression Predicting Successful Assassinations

Independent Variable	β	Wald	SE	Odds Ratio	Hypothesis
Year	-0.03	109.38	0.00	0.97***	
Official Target	-0.42	56.7	0.06	0.66***	✓
Firearms	1.06	262.11	0.07	2.89***	✓
Suicide	-3.5	100.74	0.34	0.03***	×
Total Fatalities	1.82	1,584.36	0.05	6.17***	✓
Total Injuries	-0.35	507.66	0.02	0.70***	×
Property Damage	0.01	1.2	0.01	1.01	×
Vicinity to City	-0.16	1.6	0.13	0.85	×
Region					
North America	-0.19	0.8	0.21	0.83	
Central American & Caribbean	0.47	13.93	0.13	1.61***	
South America	0.68	48.16	0.10	1.98***	
East Asia	-0.33	0.38	0.53	0.72	
Southeast Asia	0.22	3.57	0.11	1.24	
South Asia	0.14	3.18	0.08	1.15	
Central Asia	0.17	0.33	0.30	1.18	
Western Europe	-0.12	1.6	0.10	0.89	
Eastern Europe	-0.15	0.94	0.15	0.86	
Australia & Oceania	0.15	0.07	0.55	1.16	
Sub-Saharan Africa	0.34	8.73	0.11	1.40**	

Model $\chi2$ = 5,149.89***

Pseudo R2 = .486

n = 13,167; Missing = 3,491

*** p < .001, ** p < .01
Note: Reference for region = Middle East & North Africa